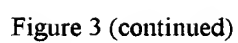


Figure 1

| | | | |
|---------|----------------|-------------|------|
| GUGCACC | matchingTimes | 3 | |
| | matchedOrg | E.colik12 | Ø |
| | | B.subtilis | Ø |
| | | Sncy.6803b | Ø |
| | treeNodeValues | 301 | 1.00 |
| | | 305 | 0.95 |
| | | 402 | 0.83 |
| | | 465 | 0.71 |
| | | 590 | 0.64 |
| UCGGGAC | matchingTimes | 4 | |
| | matchedOrg | Acp.laidla | Ø |
| | | Cor.xerosi | Ø |
| | | Hel.cholra2 | Ø |
| | | E.leptum | Ø |
| | treeNodeValues | 2304 | 1.00 |
| | | 2305 | 1.00 |
| | | 2310 | 0.94 |
| | | 2323 | 0.76 |
| | | 2330 | 0.58 |

Figure 2



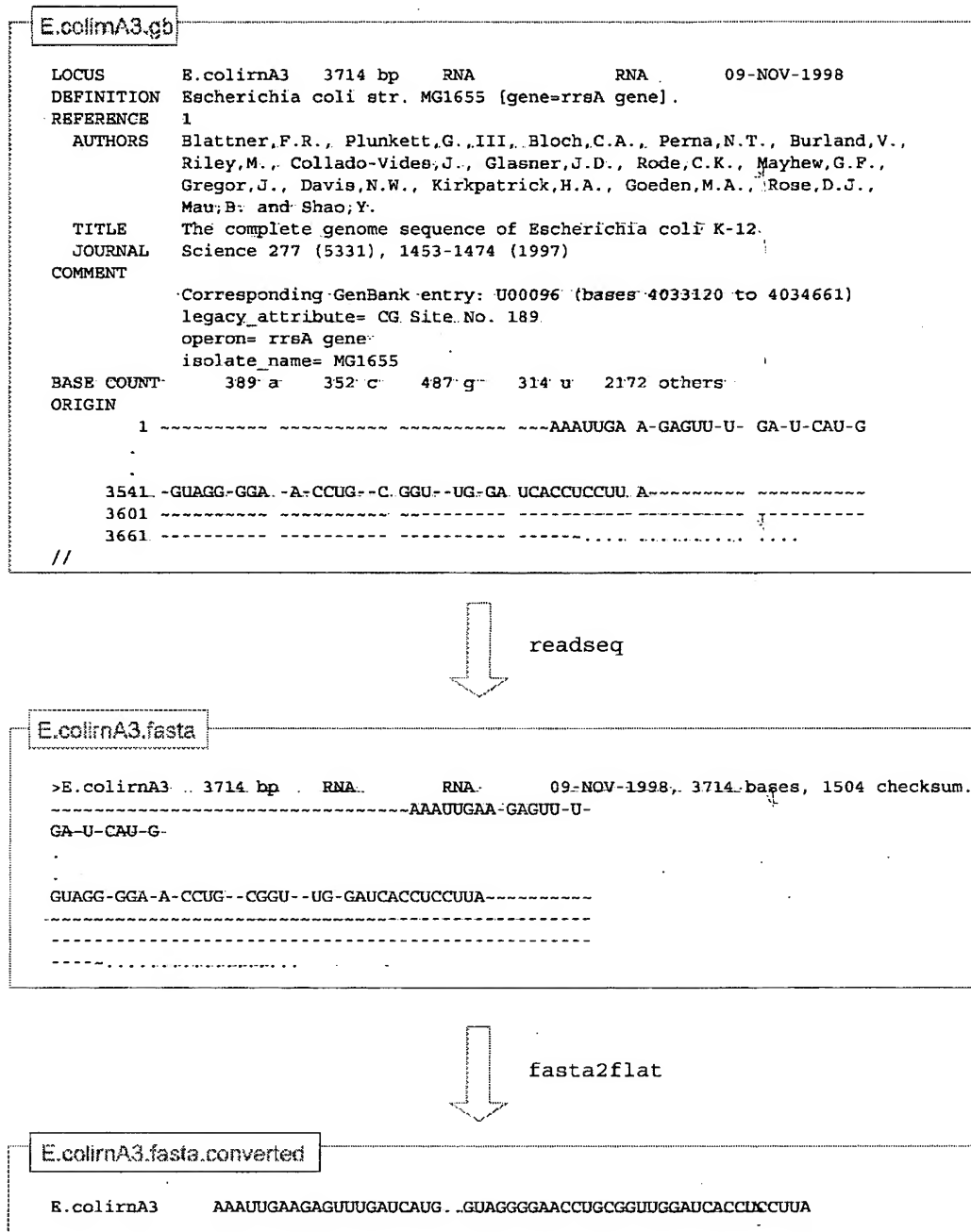


Figure 4

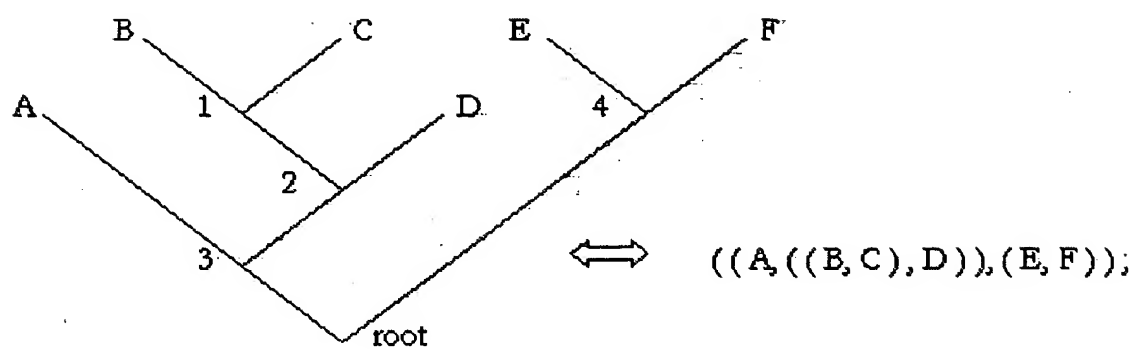


Figure 5

(a)

$((A, B), (((((C, D), E), (((F, G), H), I)), J, K)))$

(b)

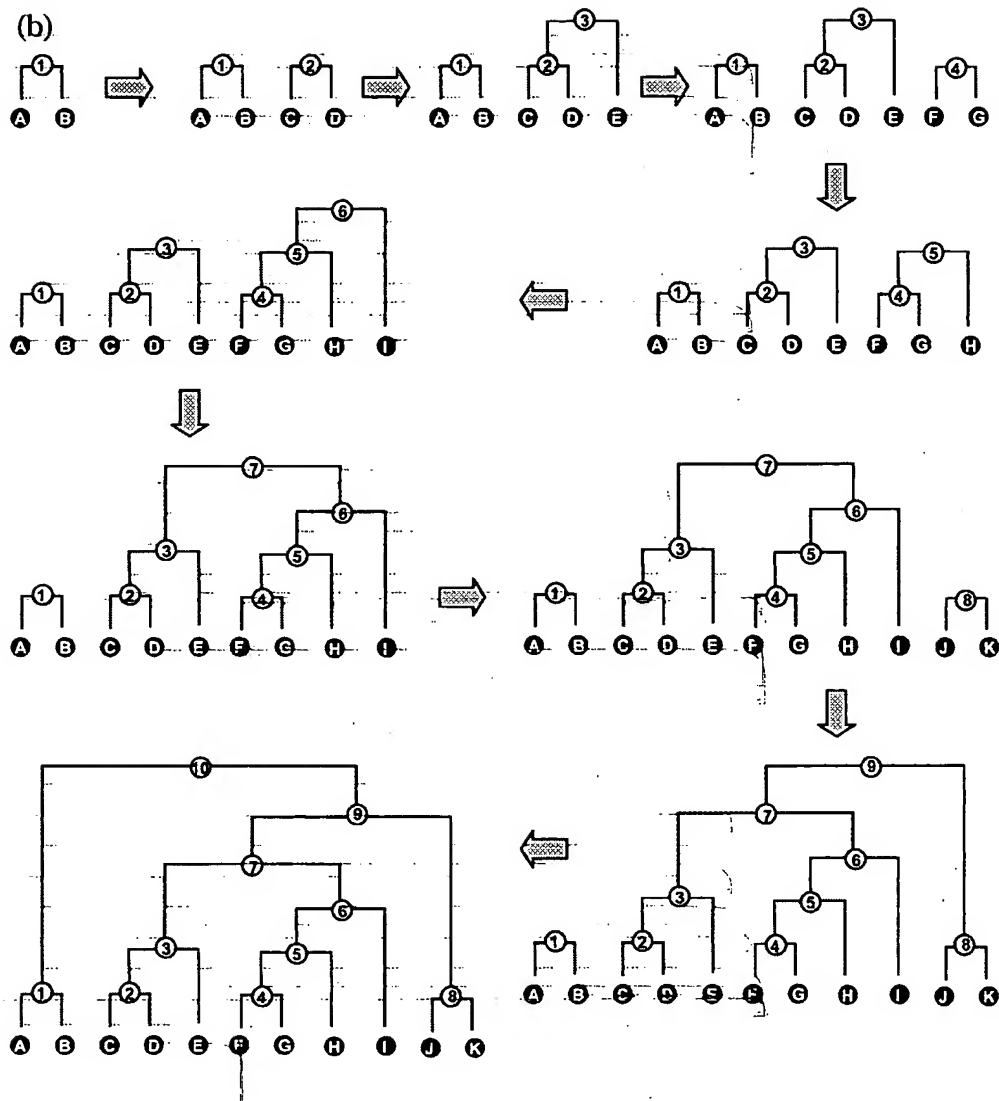


Figure 6

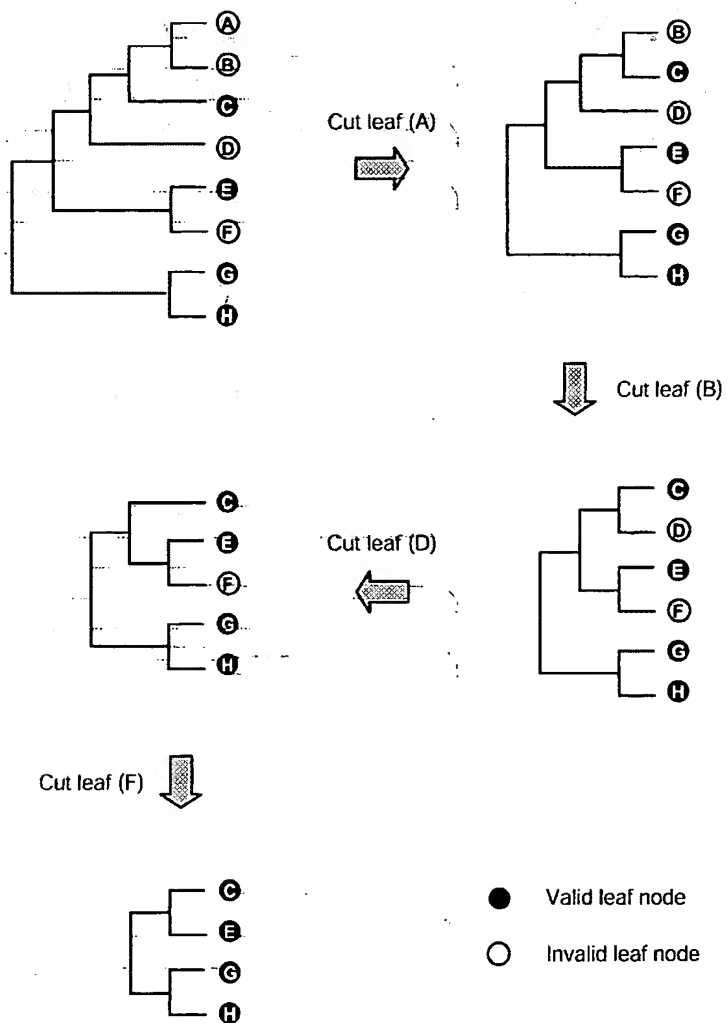


Figure 7

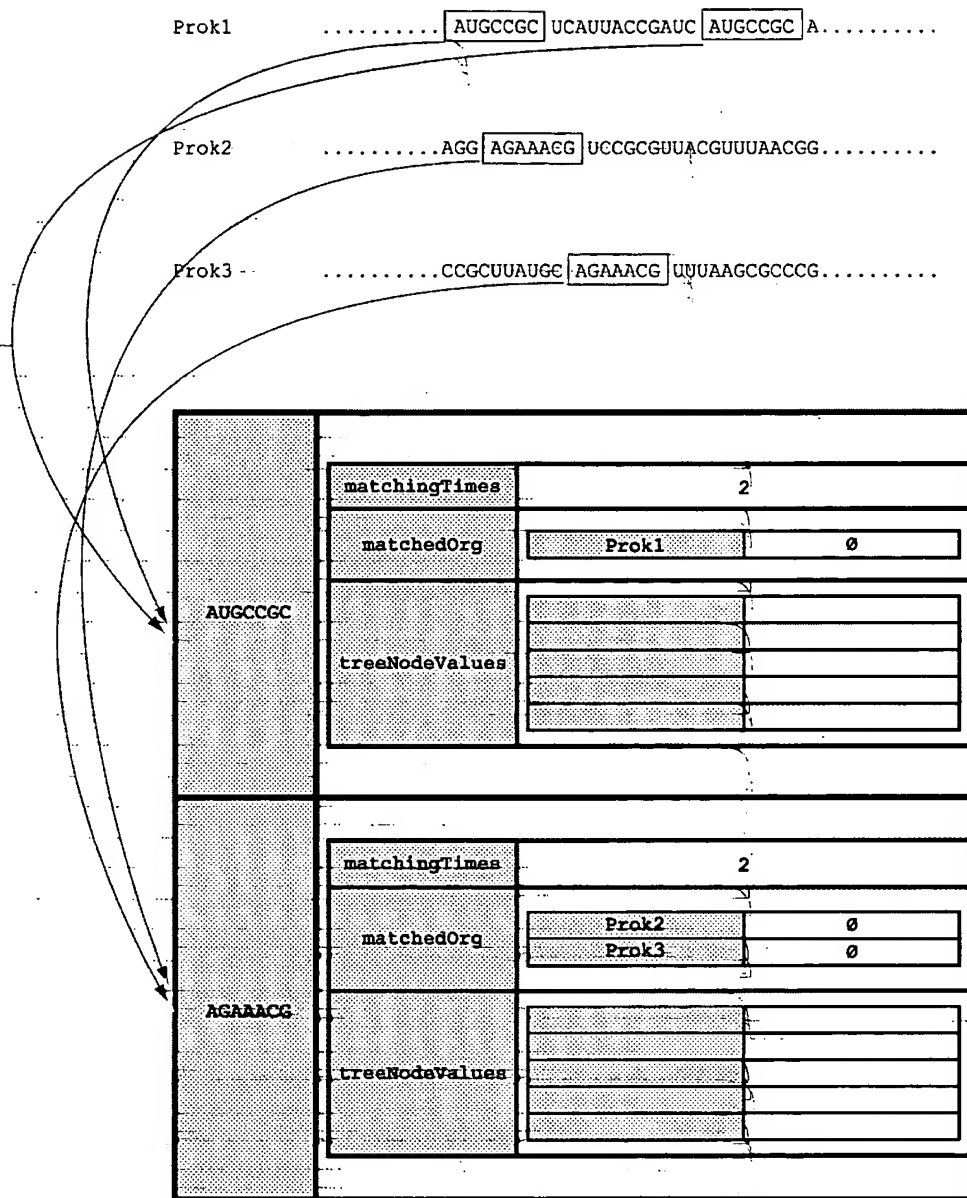


Figure 8

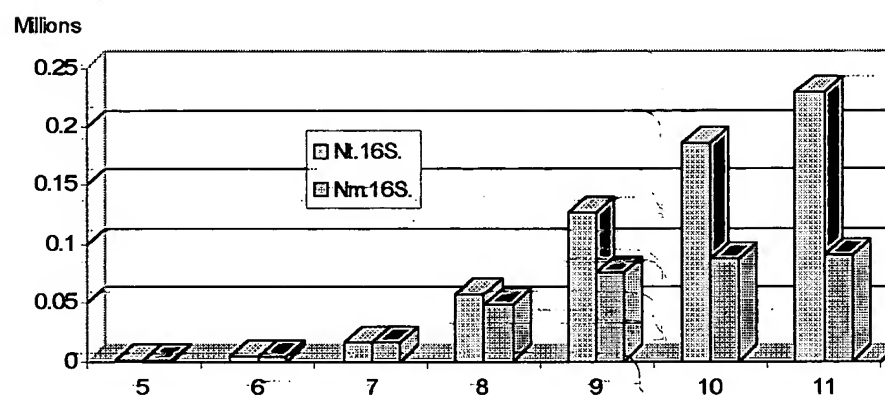
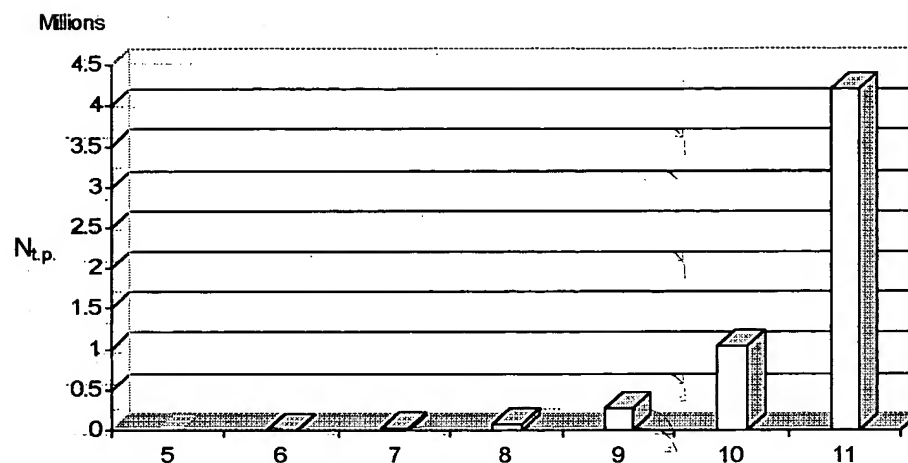


Figure 9

Figure 10 The representative prokaryotic phylogenetic tree
in Newick format.

```
(((((('(<Msr.barker> Methanosarcina barkeri-str. 227 DSM-1538': 0.13236 , '<Msp.hungat>
Methanospirillum hungatei str. JF1 DSM 864 (T)': 0.16948 ) : 0.24421 , '<Hf.volcani> Haloferax volcanii
str. DS-2 ATCC 29605 (T)': 0.03648 ) : 0.09112 , ('<env.SBAR16> Santa Barbara Channel
bacterioplankton DNA clone SBAR16': 0.19448 , '<Tpl.acidop> Thermoplasma acidophilum str. 122-1B2'
: 0.22004 ) : 0.04224 ) : 0.10775 , '<Arg.fulgid> Archaeoglobus fulgidus-str. VC-16,DSM 4304 (T)':
0.04075 ) : 0.05544 , ('<Mb.formici> Methanobacterium formicicum DSM 1312': 0.03067 , '<Mt.fervid1>
Methanothermus fervidus': 0.19624 ) : 0.01978 ) : 0.0947 , '<Tc.celer> Thermococcus celer str. VU 13
DSM 2476 (T)': 0.00981 ) : 0.05532 , ('<Mc.vanniel> Methanococcus vannielii str. EY33': 0.02484 ,
'<Mc.jannasc> Methanococcus jannaschii str. JAL-1 DSM-2661 (T)': 0.1614 ) : 0.00857 ) : 0.02807 ,
'<Mpy.kand11> Methanopyrus kandleri str. av19 DSM 6324 (T)': 0.09845 ) : 0.02703 , ('<env.pJP27> Mud
Volcano area of Yellowstone NP ("Black Pool")-hot spring DNA clone pJP27': 0.06783 ,
('<env.SBAR12> Santa Barbara Channel bacterioplankton DNA clone SBAR12': 0.1046 , '<env.pJP89>
Mud Volcano area of Yellowstone NP ("Black Pool")-hot spring DNA clone pJP89': 0.28523 ) : 0.01132 ,
('<Tmf.penden> Thermofilum pendens str. Hvv3 DSM 2475 (T)': 0.04404 , ('<Sul.acalda> Sulfolobus
acidocaldarius str. 98-3 ATCC 33909 (T)': 0.04024 , '<Thp.tenax> Thermoproteus tenax': 0.15875 ) :
0.02106 ) : 0.09273 ) : 0.20883 ) : 0.03789 ) : 0.31178 , ('<Aqu.pyroph> Aquifex pyrophilus str. Kol5a':
0.20649 , ('<Tt.maritim> Thermotoga maritima-str. MSB8-DSM 3109 (T)': 0.01001 , '<Fer.island>
Fervidobacterium islandicum str. H-21 DSM 5733 (T)': 0.16351 ) : 0.23062 , (((('<Mei.ruber4>
Meiothermus ruber str. Loginova 21-ATCC-35948 (T)': 0.14908 , '<D.radiodur> Deinococcus radiodurans
ATCC 35073': 0.19907 ) : 0.08298 , ('<Cfx.aurant> Chloroflexus aurantiacus str. J-10-fl ATCC 29366 (T)':
0.1976 , '<Tmc.roseum> Thermomicrobium-roseum ATCC 27502 (T)': 0.36297 ) : 0.11213 ) : 0.01165 ,
((((((((('(<Acp.laidla> Acholeplasma laidlawii str. JAI': 0.11002 , '<C.ramosum> Clostridium ramosum
str. 113-I ATCC 25582 (T)': 0.30774 ) : 0.00736 , '<M.capricol> Mycoplasma capricolum ATCC 27343
(T) [gene=rrnB]': 0.38452 ) : 0.10528 , '<Stc.therm3> Streptococcus thermophilus DSM 20617 (T)':
0.05073 ) : 0.15065 , '<Eco.faecal> Enterococcus faecalis': 0.0306 ) : 0.01738 , ('<L.casei> Lactobacillus
casei subsp. casei ATCC 393 (T)': 0.13937 , '<L.delbruck> Lactobacillus delbrueckii subsp. delbrueckii
str. Calvert ATCC 9649 (T)': 0.04809 ) : 0.01852 ) : 0.02217 , '<Lis.monoc3> Listeria monocytogenes':
0.02418 ) : 0.0404 , '<B.cereus4> Bacillus cereus IAM 12605 (T)': 0.06989 ) : 0.0034 , ('<B.subtilis>
Bacillus subtilis str. 168': 0.05051 , '<B.stearoth> Bacillus stearothermophilus NCD0 1768 (T)': 0.05959 )
: 0.0075 ) : 0.12658 , '<Eub.barker> Eubacterium barkeri ATCC 25849 (T)': 0.28781 ) : 0.0097 ,
('<C.quercico> Clostridium quercicolum ATCC 25974 (T)': 0.13519 , '<Hel.chlor2> Heliobacterium
chlorum ATCC 35205 (T)': 0.1075 ) : 0.01024 ) : 0.01183 , ('<Fus.nuclea> Fusobacterium nucleatum
subsp. nucleatum ATCC 25586 (T)': 0.08593 , ('<Stm.ambofa> Streptomyces ambofaciens': 0.06051 ,
('<Cor.xerosi> Corynebacterium xerosis ATCC-373 (T)': 0.10315 , ('<Bif.bifidu> Bifidobacterium bifidum.
```

ATCC 29521 (T)' : 0.29842 , '<Arb.globif> Arthrobacter globiformis str. 168 DSM 20124 (T)' : 0.12957) :
 0.06797) : 0.00748) : 0.3137) : 0.01738) : 0.00511 , ('<C.leptum> Clostridium leptum ATCC 29065 (T)' :
 : 0.16126 , ('<C.butyric4> Clostridium butyricum str. E.VI.3.6.1 NCIMB 8082' : 0.06037 , '<C.pasteuri>
 Clostridium pasteurianum ATCC 6013 (T)' : 0.07626) : 0.38023) : 0.02432) : 0.01262 ,
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 Spirillum volutans ATCC 19554 (T)' : 0.06661) : 0.00462 , '<Rcy.purpur> Rhodocyclus purpureus str.
 6770 DSM 168 (T)' : 0.04015) : 0.02165 , '<Nis.gonor1> Neisseria gonorrhoeae str. B 5025 NCTC 8375
 (T)' : 0.19789) : 0.01431 , '<Ste.maltop> Stenotrophomonas maltophilia ATCC 13637 (T)' : 0.24098) :
 0.02299 , ('<E.coli> Escherichia coli [gene=rrnB operon]' : 0.05825 , '<Ps.aerugi3> Pseudomonas
 aeruginosa DSM 50071 (T)' : 0.63646) : 0.03524) : 0.04488 , '<Alm.vinosm> Allochromatium vinosum
 ATCC 17899 (T)' : 0.0233) : 0.04869 , '<Hrh.halch2> Halorhodospira halochloris str. A ATCC 35916 (T)' :
 : 0.05948) : 0.08019 , (('<R.rubrum3> Rhodospirillum rubrum str. ATH 1.1.1; S.1 ATCC 11170 (T)' :
 0.04904 , '<Azs.brazi2> Azospirillum brasilense str. Sp 7 NCIMB 11860 (T)' : 0.3086) : 0.01343 ,
 (('<Ric.prowaz> Rickettsia prowazekii str. Breinl ATCC VR-142 (T) (alpha purple bacterium)' : 0.1406 ,
 '<Spg.capsul> Sphingomonas capsulata ATCC 14666 (T)' : 0.13872) : 0.02068 , ('<Rhb.legum8>
 Rhizobium leguminosarum IAM 12609 (T)' : 0.01576 , ('<Bdr.japoni> Bradyrhizobium japonicum LMG
 6138 (T)' : 0.05736 , '<Rm.vanniel> Rhodomicrobium vannielii str. EY33 ATCC 51194' : 0.093) : 0.04263
) : 0.00617) : 0.03466) : 0.06772) : 0.00546 , ('<Myx.xanthu> Myxococcus xanthus str. DK1622' :
 0.11263 , '<Dsb.postga> Desulfobacter postgatei str. 2 ac 9 DSM 2034 (T)' : 0.19098) : 0.01154 ,
 ('<Dsv.desulf> Desulfovibrio desulfuricans subsp. desulfuricans ATCC 27774' : 0.01563 , ('<Bde.stolpi>
 Bdellovibrio stolpii str. UKi2 ATCC 27052 (T)' : 0.05967 , ('<Cam.jejun5> Campylobacter jejuni subsp.
 jejuni str. TGH 9011 ATCC 43431' : 0.01753 , ('<Wln.succi2> Wolinella succinogenes str. 602W (FDC)
 ATCC 29543 (T)' : 0.05551 , '<Hlb.pylor6> Helicobacter pylori ATCC 43504 (T)' : 0.02351) : 0.18884) :
 1.11671) : 0.18947) : 0.01602) : 0.15633) : 0.01513 , (((((((('<Trp.pallid> Treponema pallidum str.
 Nichols' : 0.14543 , '<Spi.stenos> Spirochaeta stenostrepta str. Z1 ATCC 25083 (T)' : 0.03623) : 0.03698 ,
 '<Bor.burgdo> Borrelia burgdorferi str. B31 ATCC 35210 (T)' : 0.3604) : 0.0859 , '<Spi.haloph>
 Spirochaeta halophila str. RS1 ATCC 29478 (T)' : 0.02473) : 0.01206 , '<Brs.hyodys> Brachyspira
 hyodysenteriae str. B204 ATCC 31212' : 0.43546) : 0.04129 , ('<Lpn.illini> Leptonema illini str. 3055' :
 0.07041 , '<Lps.interK> Leptospira interrogans str. Kennewicki, serovar pomona' : 0.16902) : 0.05013) :
 0.01817 , ('<Fib.sucS85> Fibrobacter succinogenes subsp. succinogenes str. S85 ATCC 19169 (T)' :
 0.23142 , '<Acbt.capsl> Acidobacterium capsulatum str. 161' : 0.21099) : 0.03073) : 0.0094 ,
 (((((((('<Syn.6301> Synechococcus sp. PCC 6301' : 0.12285 , '<Nost.muser> Nostoc muscorum PCC 7120' :
 0.06977) : 0.01225 , ('<Zea_mays_C> Zea mays (maize; corn; Indian corn) -- chloroplast' : 0.145 ,
 '<Olst.lut_C> Olisthodiscus luteus (stramenopile) -- chloroplast' : 0.3525) : 0.09491) : 0.012 ,
 '<Glb.violac> Gloeobacter violaceus PCC 7421' : 0.07279) : 0.01171 , ('<env.MC18> Mount Coot-tha
 region (Brisbane, Australia)-5-10cm-depth-soil-DNA clone MC 18' : 0.01409 , ('<Chd.psitta>
 Chlamydophila psittaci str. 6BC ATCC VR-125 (T)' : 0.36004 , '<Pir.staley> Pirellula staleyi ATCC 27377'

: 0.34247) : 0.25993) : 0.1121) : 0.03258 , ('<Chl.limico> Chlorobium limicola str. 8327' : 0.1389 ,
 ('<Tnm.lapsum> Thermonema lapsum ATCC 43542 (T)' : 0.0332 , ('<Flx.litora> Flexibacter litoralis str.
 Lewin SIO-4 ATCC 23117 (T)' : 0.01576 , ('<Cy.hutchin> Cytophaga hutchinsonii str. D465 (P.H.A.
 Sneath) ATCC 33406 (T)' : 0.0073 , ('<Prb.diffu> Persicobacter diffluens str. Lewin LIM-1 ATCC 23140'
 : 0.00585 , ('<Sap.grandi> Saprospira grandis ATCC 23119 (T)' : 0.02768 , ('<Flx.canada> Flexibacter
 canadensis ATCC 29591 (F)' : 0.03254 , ('<Bac.fragil> Bacteroides fragilis ATCC 25285 (T)' : 0.04826 ,
 ('<Prv.rumcol> Prevotella ruminicola subsp. ruminicola ATCC 19189 (T)' : 0.20539) : 0.02821 ,
 ('<Cy.lytica> Cytophaga lytica str. LIM-21 ATCC 23178 (T)' : 0.14365 , ('<Emb.brevi2> Empedobacter
 brevis ATCC 14234' : 0.0913) : 0.35994) : 0.12199) : 0.33291) : 0.47588) : 0.14622) : 0.18424) :
 0.08878) : 0.30465) : 0.05104) : 0.00825) : 0.02261) : 0.00329) : 0.56238) : 0.52312) : 0.05444) :
 0.31178);

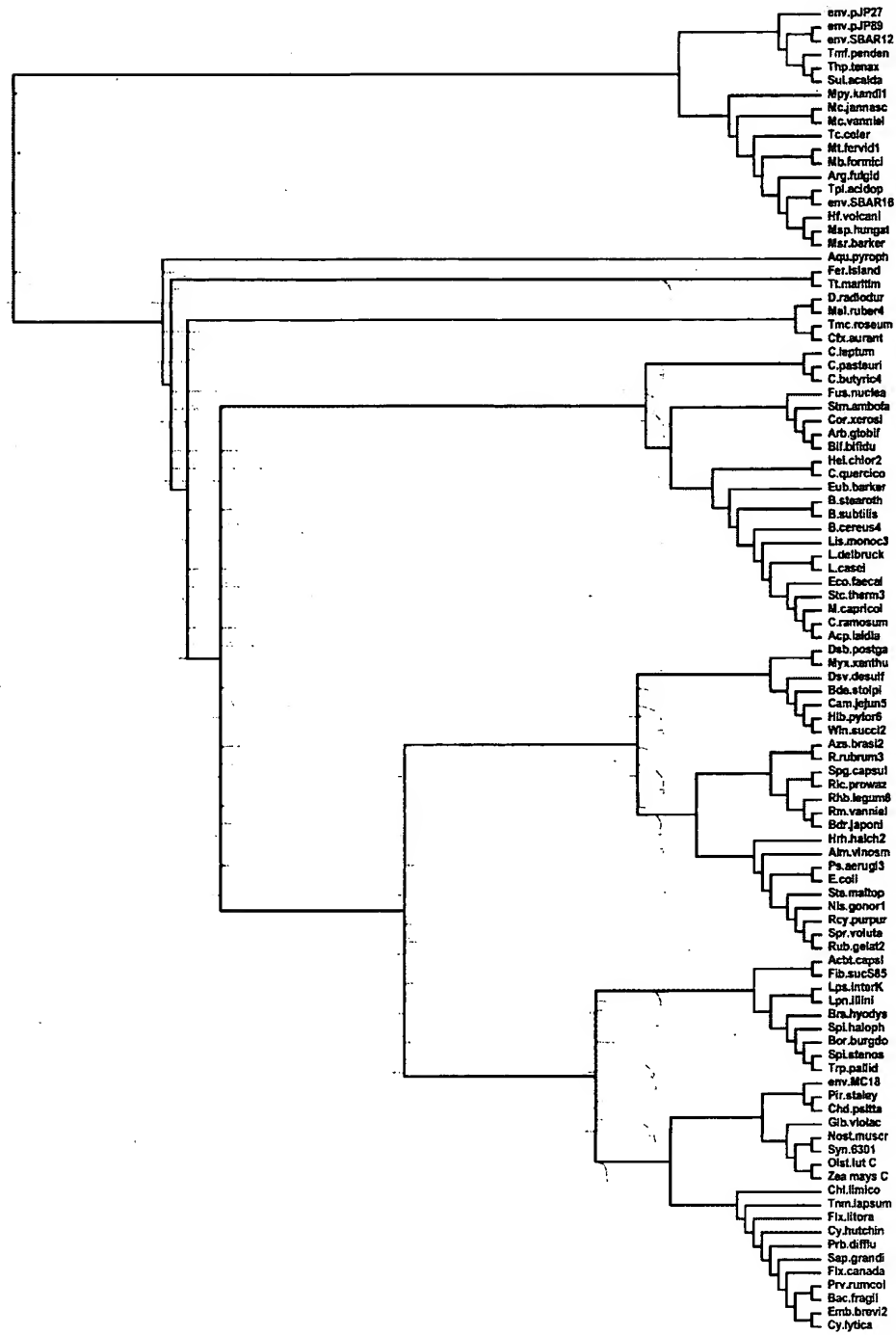


Figure 11

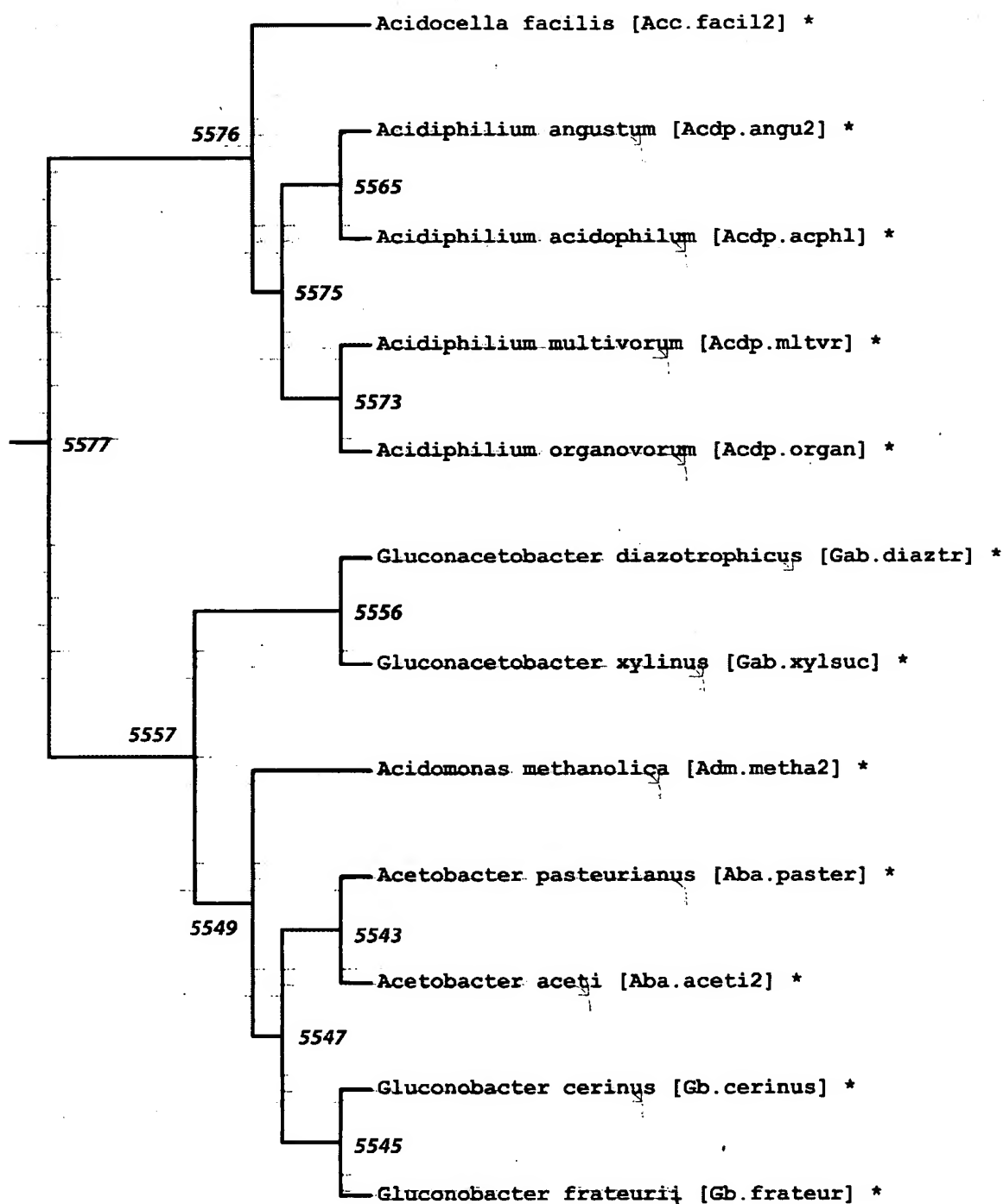


Figure 12